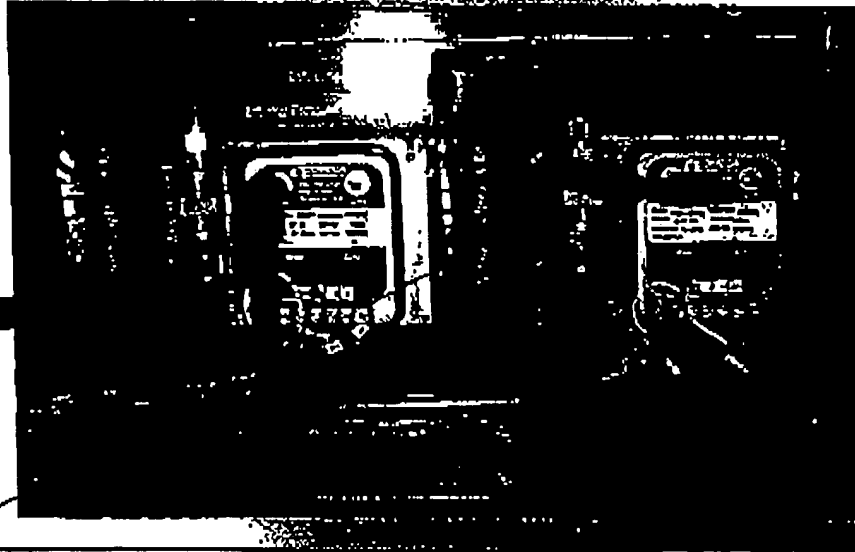


## Mechanical Lung (Rear View)

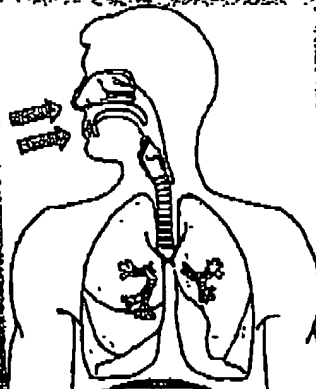


## Inhalation

Air Enters the  
Nose and Mouth

The Chest  
Elastically Expands

Diaphragm Is  
Forcefully Lowered



Resistance Is  
Offered in the  
Trachea and

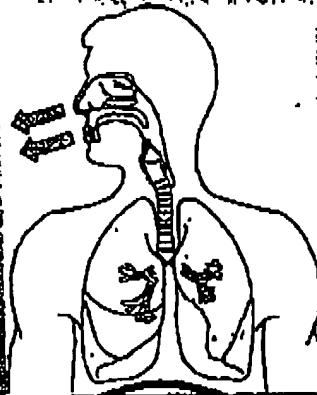
FIG. 1

## Exhalation

Air Exits the  
Nose and Mouth

The Chest Tends  
to Be Un-Deformed  
Position

The Diaphragm  
is Relaxed (Passive)



Resistance is  
Created in the  
Lungs and  
Trachea

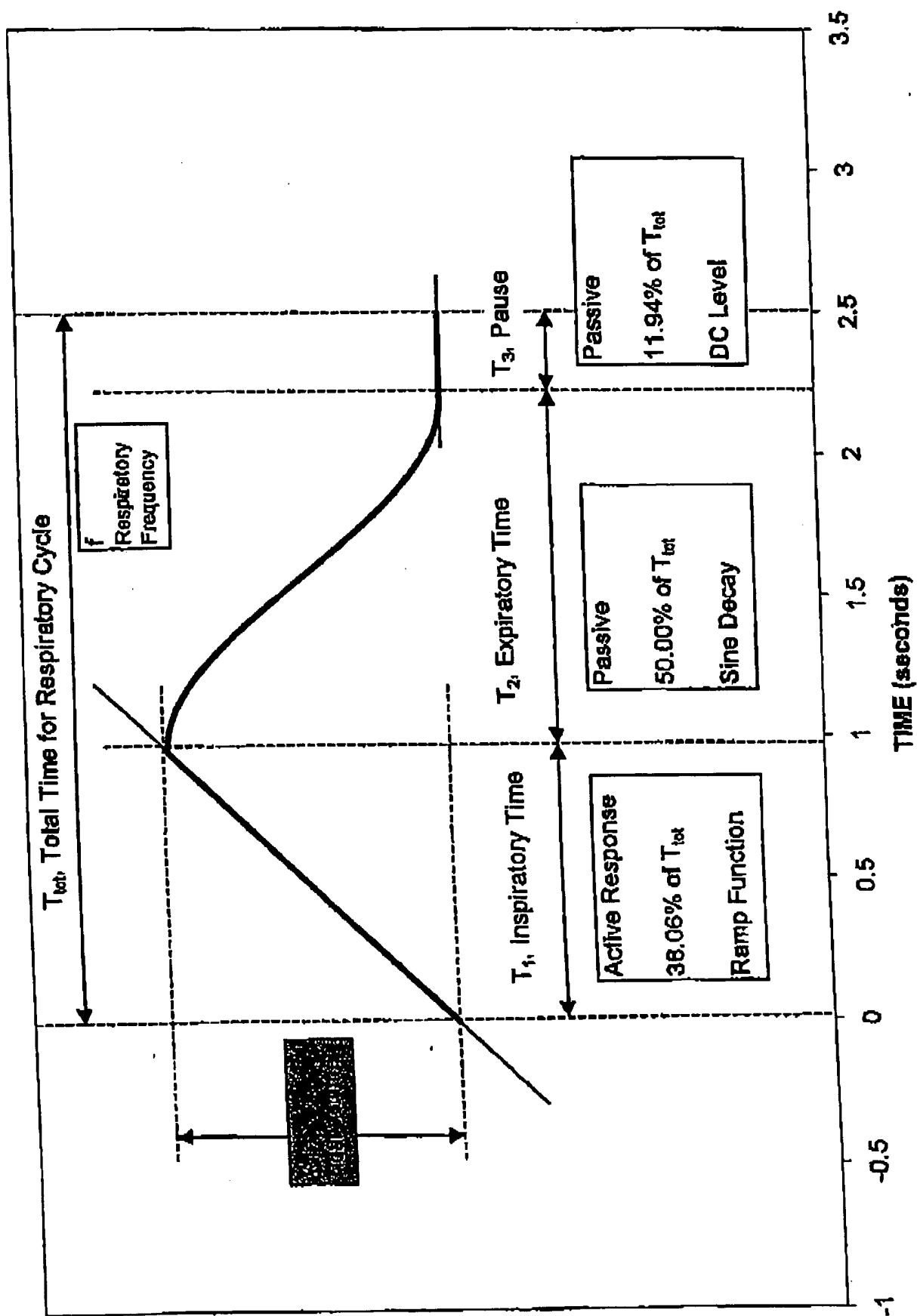
FIG. 2

## Respiration Control

Diaphragm

Linear  
Actuator





3  
G  
E

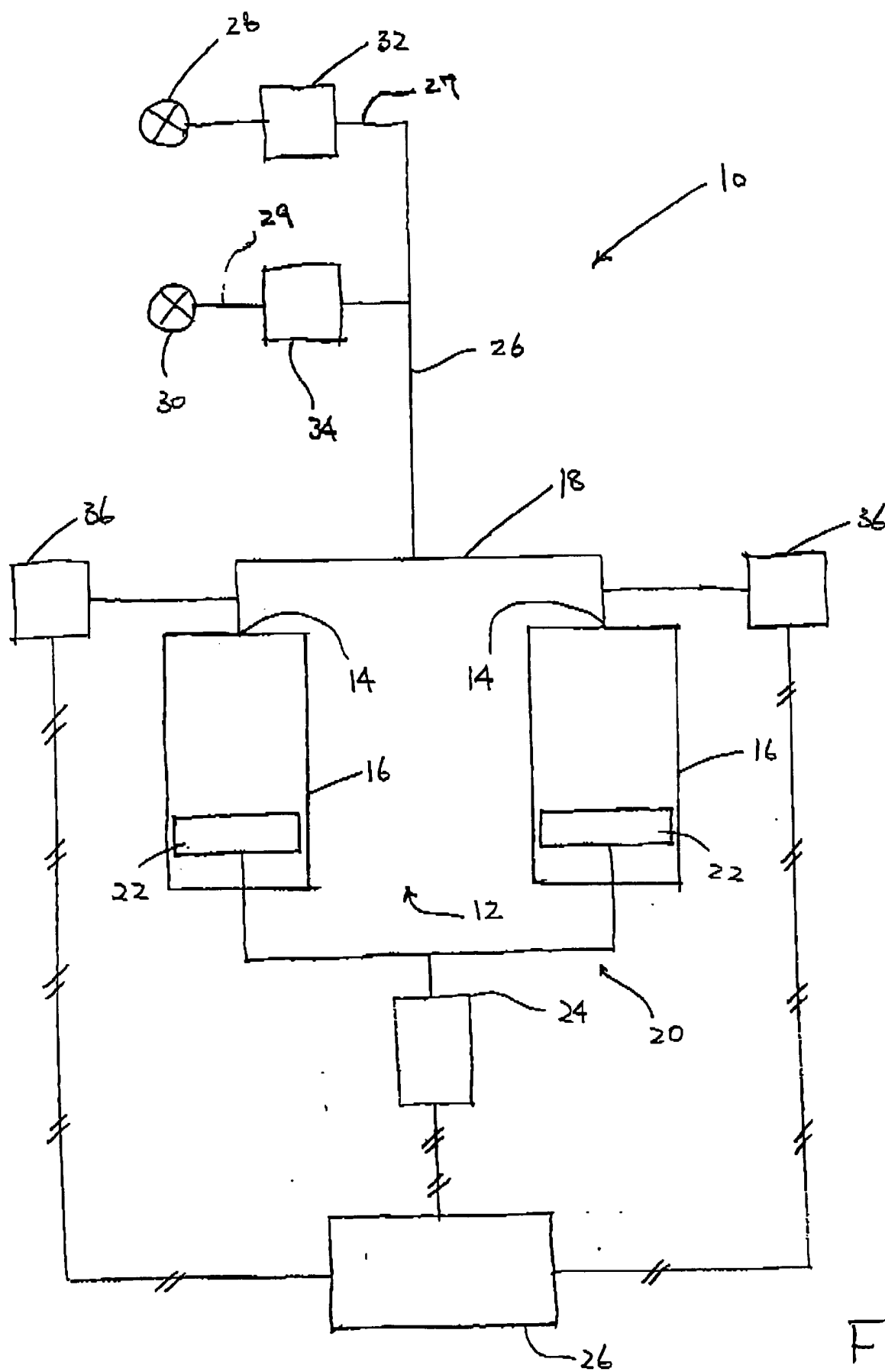
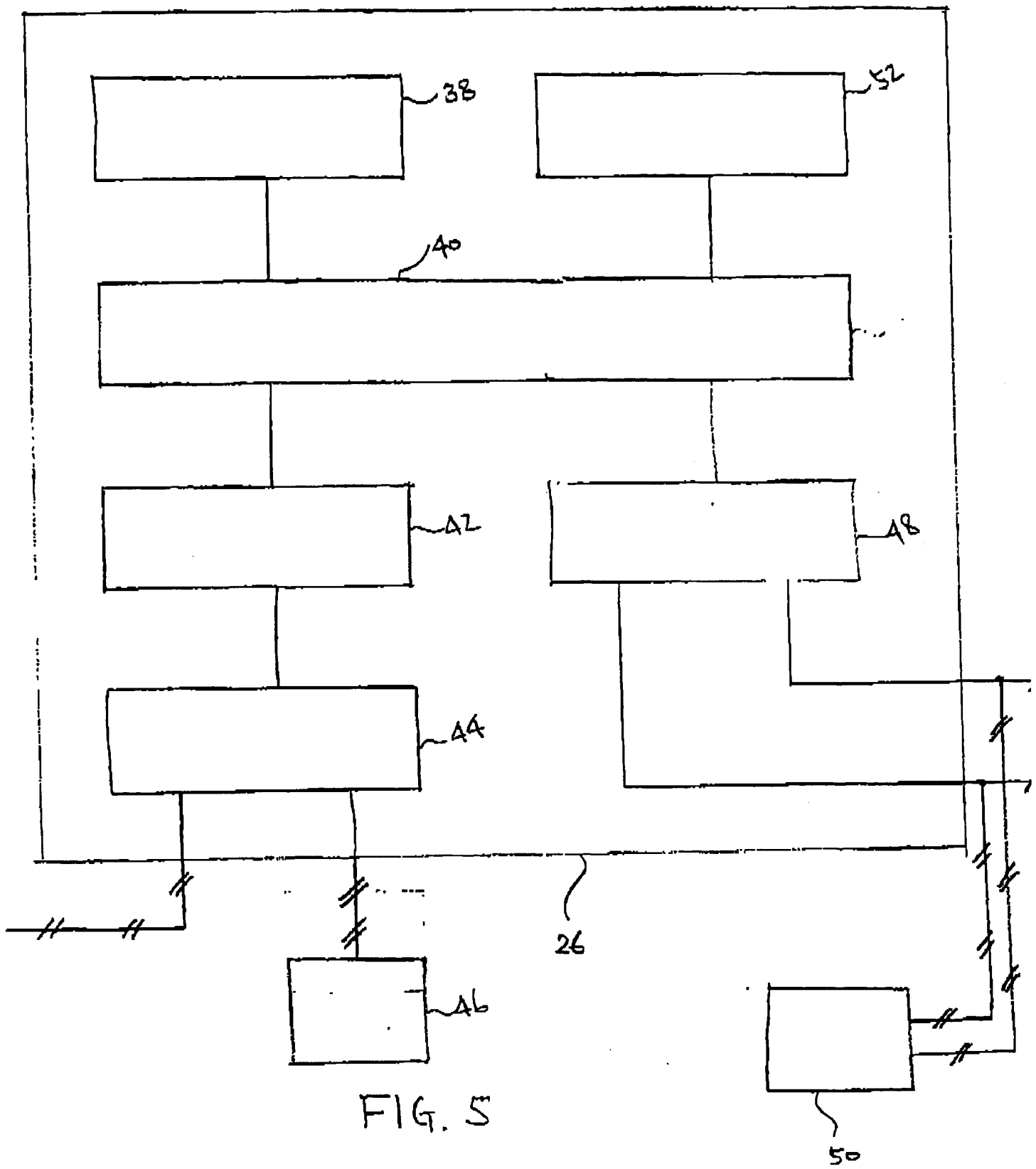


FIG. 4



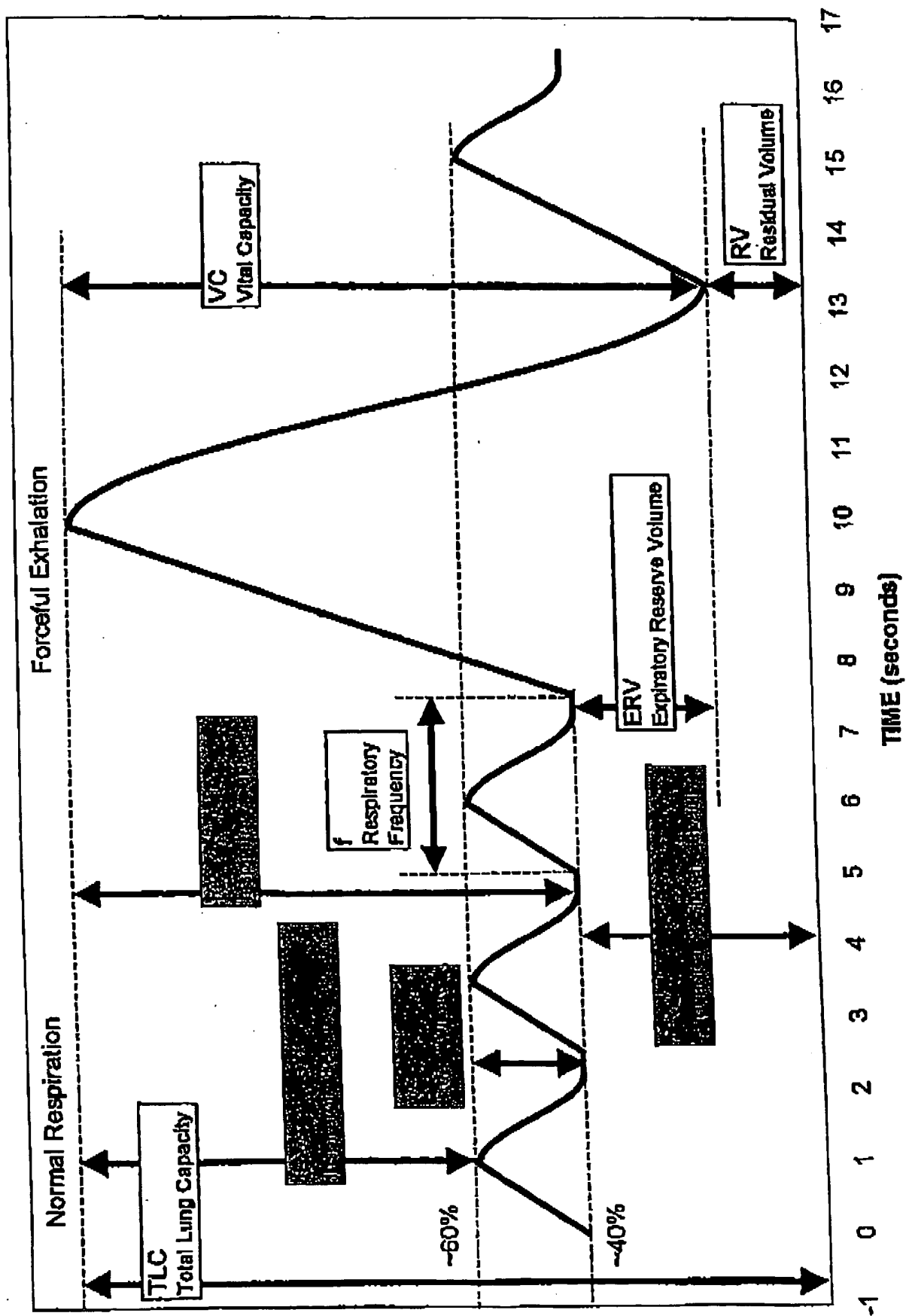


FIG. 6

AGE (years)

	1	2	3	4	5	6	7	8	9	10	11	12
Lung Capacity												
Total Lung Capacity		833	1213	1340	1467	1802	2138	2473	2788	3123	3448	3773
Vital Capacity		475	693	910	1105	1362	1603	1855	2089	2343	2586	2830
Residual Volume		158	231	303	335	397	534	618	700	781	862	943
TLC = VC + RV												
RV = 0.25 * TLC												
Normal Respiration												
Functional Residual Capacity		263	398	532	666	800	1003	1174	1344	1515	1685	1855
Tidal Volume		78	95	112	131	150	163	180	200	220	240	260
Inspiratory Capacity		370	526	681	744	807	971	1135	1289	1434	1574	1718
Inspiratory Reserve Volume		202	431	569	623	677	824	972	1119	1254	1389	1524
Frequency (cycles/minute)		24	23	22	21	20	19	18	18	17	17	16
TLC = FRC + VT												
FRC = FRC + VT + IRV												
IRV = VT + RV												
FRC = 0.30 * TLC (upright)												
FRC = 0.40 * TLC (supine)												
Forced Exhalation		105	167	228	291	283	381	488	558	645	734	823
Expiratory Reserve Volume												
Frequency (cycles/minute)												
TLC = IC + ERV + RV												
VC = ERV + IC												

Note: Volume = the volume of 1 lung, Tot Vol = the volume of both lungs

Enter values of "red" text only.

Calibration (Model Lungs and Linear Actuator)	Position (inches)	Voltage (V)	Volume (ml)	Tot Volume (ml)
Baseline (0.00-inches, 0.0 volts)	0.00	0.00	80	160
Fully Extended (6.00-inches, 5.0 volts)	6.00	5.00	995	1990
V <sub>max</sub>			0.0055	0.0077
mV/V			183	386

Normal Respiration Cycle	Tot (sec)	2.508	2.608	2.717	2.807	2.800	2.803	2.814	2.833	2.828	2.836	2.844
Total Time (1 Respiration Cycle)	T1 (sec)	0.852	0.953	1.058	1.087	1.142	1.181	1.223	1.289	1.305	1.343	1.364
Inspiratory Time (T1), Ramp, 38.05%	T2 (sec)	1.250	1.374	1.469	1.409	1.500	1.552	1.607	1.687	1.714	1.785	1.818
Expiratory Time (T2-T1), Sine Decay, 50%	T3 (sec)	0.299	0.311	0.328	0.341	0.358	0.371	0.384	0.398	0.409	0.421	0.434
Pause (T3-T2), DC Level, 11.94%												
Programming Settings:												
RAMP	RS (V)	0.2814	0.6489	1.0164	1.1913	1.3881	1.8342	2.3024	2.7705	3.2357	3.7008	4.1680
Start	RE (V)	0.4845	0.8085	1.3224	1.5218	1.7213	2.2350	2.7488	3.2623	3.7621	4.3018	4.8217
End												
SINE	SA (V)	0.1088	0.1288	0.1530	0.1653	0.1778	0.2004	0.2231	0.2459	0.2732	0.3005	0.3278
Amplitude	SD (V)	0.3880	0.7787	1.1894	1.3566	1.5437	2.0348	2.5255	3.0184	3.5089	4.0014	4.4939
Offset	SF (Hz)	0.4000	0.3833	0.3667	0.3500	0.3333	0.3222	0.3111	0.3000	0.2889	0.2778	0.2667
Freq (Hz)	SP (deg)	90	90	90	90	90	90	90	90	90	90	90
Phase												
DC LEVEL	DO (V)	0.2814	0.6489	1.0164	1.1913	1.3881	1.8342	2.3024	2.7705	3.2357	3.7008	4.1680
Offset												

Fig. 7

# Manikin Connections

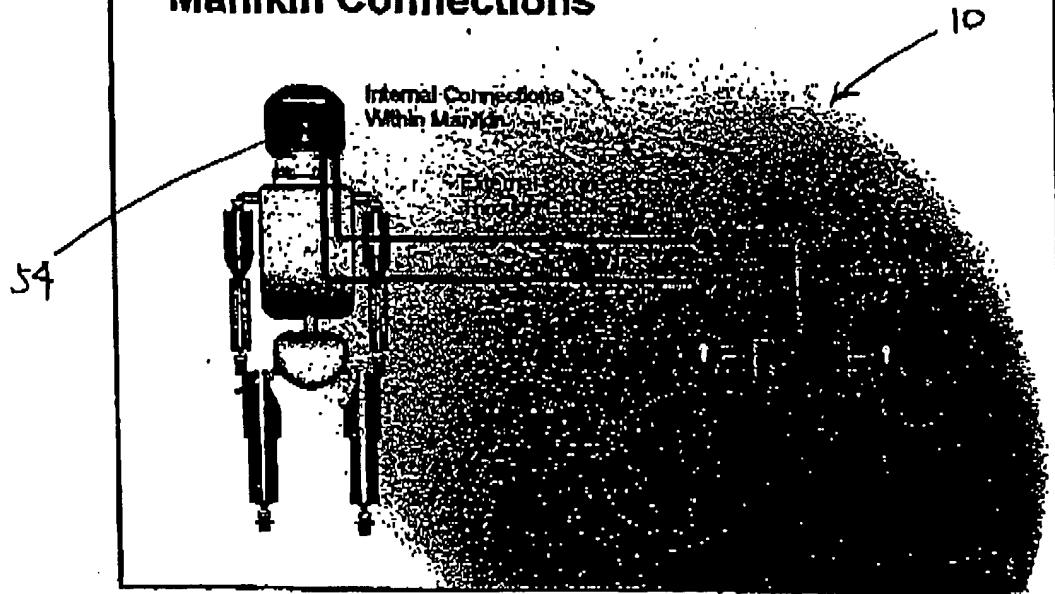


FIG. 8

# Manikin Connections

